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(54) **A ROOF WINDOW OR A ROOF HATCH WITH A SASH OPENABLE OUTWARDS WITH A FIXING ASSEMBLY FOR THE UPPER CASING ELEMENT**

EIN DACHFENSTER ODER DACHAUSSTIEGSFENSTER MIT EINEM NACH AUSSEN OFFENBAREN FLÜGELRAHMEN MIT EINER BEFESTIGUNGSANORDNUNG ZUR BEFESTIGUNG AM OBEREN ABDECKELEMENT

FENÊTRE DE TOIT OU SAS DE TOIT À BATTANT OUVRABLE VERS L'EXTÉRIEUR AVEC MÉCANISME DE FIXATION DE L'ÉLÉMENT DE RECOUVREMENT SUPÉRIEUR

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Description

[0001] The invention relates to a roof window or hatch comprising preferably two mutually symmetrical fixing assemblies for the upper casing, the assemblies being arranged symmetrically on the upper corners of the sash openable outwards, while the upper casing is mounted on the sash elements, simultaneously providing a seal protecting from all weather conditions for the connection of the upper casing with side casings.

[0002] The casings are basically installed on the whole circumference of the sash frame. In its typical rectangular design, an openable roof window has basically four casings, covering the side elements, the upper elements and the lower elements of the window. In such a configuration, the sash is an element comprising preferably a plurality of symmetrical elements arranged symmetrically in relation to both symmetry planes, thus the opposite fixing assemblies for the casing elements contain features and shapes being mutual mirror images.

[0003] The casings of roof windows, typically formed from metal sheets, protect the window frame and the window sash from adverse weather conditions. The casings of the window frame are generally installed immovably and mate with a flange sealing the connection of the window frame with the roof cover, while the casings of the window sash are in general connected immovably with their corresponding sash frame members.

[0004] In case of roof windows or hatches with a sash openable outwards, a complete casing set is most often composed of two side casings, an upper casing and a lower casing.

[0005] The casings made of metal sheets are most often fixed using screws, catch pawls or rivets, and feature mounting holes intended for this purpose. Usually, the fixing points utilise installation slots located in the sash frame members, most often in the corners, while the installation slots may be immovable or slidable, if a compensation for differences resulting from working tolerances and thermal expansion of the sash frame members and the casings is required. In such cases, generally the second fixing point of the casing is constituted by installation slots slidable along the sash frame member. The above solutions have a disadvantage consisting in that it is necessary to prepare installation through-holes in the casings, the holes constituting possible leak points for rainfall. This problem may be solved by using additional installation elements on the inside of the casing or at its ends.

[0006] One of known solutions is a set composed of a comb joint on one end of the casing and a snap-on joint on its other end, described in Patent Description no. PL 212427. The set was disclosed for use in a pivot window, with a relatively short casing element of the sash, and the snap-on joint requires rather strict working tolerances. In case of large temperature changes leading to various thermal elongations, it may pose an installation problem while connecting the snap-on elements. Moreover, this system does not provide any possibility of fixing the casing on the sash element tightly and rigidly, which would eliminate vibrations and noise caused by the casing, for instance as a result of turbulences of the surrounding air.

[0007] A necessity to seal the interconnections between the casings constitutes an additional problem in roof windows. Solutions utilising a lap joint of the upper casing onto the side casings are known. Their advantage is simplicity and low manufacturing cost, however such a connection does not constitute a completely effective barrier for penetration of water, particularly the water transported by wetting of external walls in narrow crevices.

[0008] Also solutions are known in which the casings are connected and sealed in the connecting edges by plastic connectors. The connectors feature slotted sockets, into which the edges of the metal sheet profiles are inserted, and in some solutions they are fixed to the sash frame, being fixing points for the casings.

[0009] One of such solutions is a set of elements for fixing the casings, disclosed in application no. EP 2666926 A1, the set being based on a plastic corner element, comprising elements for quick fastening to fixed elements of the window or those of the window sash. The corner element is slipped onto the metal sheet casing profile, then the set is fixed to the sash frame. This solution enables fast installation of the casing elements on the window sash and it is aesthetic, however it does not provide for any necessity to compensate the thermal elongation of the metal sheet casings. During an intense insolation the temperature rises and the casings profiles elongate leading to stresses in the mating elements when the compensation is not provided for, which may result in their cracking. It is of a particular importance in case of use of more and more popular plastic corner connectors featuring lower mechanical strength, where thermal stresses may lead to their deformation or failure. A compensating element or system is necessary in such solutions.

[0010] There is also a known solution from patent application DE102009033938A1 representing a roof window with a sash comprising a casings mounted on said sash. The roof window comprises a fixing assembly arranged for fixing said casings to the sash. The fixing assembly comprises a fixing element containing a mounting slot for a longitudinal insertion of an edge of the casing, the element being immovably mounted on a bracket which comprises a stem fixed to the sash. The fixing element is locked on the bracket using a locking mechanism. The locking mechanism comprising a latching hook and a latching counter element cooperating together by inserting one to the other after what the fixing element is immovably mounted on the sash. The preamble of claim 1 is known from this document.

[0011] The aim of the proposed solution consists in the provision of a fixing assembly for the upper casing of a roof window eliminating the necessity to use connector

elements, requiring a breach in the structural continuity of the casing (e.g. installation holes), ensuring quick installation of the casings on the sash frame and interconnection of the casings, as well as leakproofness of the structure irrespective of variable weather conditions, particularly temperature changes, leading to thermal elongations of the structural elements and the casings.

[0012] The above requirements are met by a roof window according to the proposed invention as defined in claim 1, comprising a set of elements which provide separable fastening of the upper casing on its ends and the side casings on their top ends, without a necessity to breach the structural continuity of their coating, additionally providing a seal of the connection of the upper casing with the side casings in upper corners of the window.

[0013] The fixing assembly is basically composed of two sets mounted on the upper corners of the sash of a roof window or a roof hatch, the sets being mutual mirror images in relation to the plane of symmetry of the upper casing. Considering the symmetry of the majority of important elements of the fixing assembly, further description will pertain to a single set, unless specified otherwise.

[0014] A fixing assembly is basically composed of a fixing element mounted on a universal bracket. The bracket is an element preferably made of structural metal sheet by bending of flat blank. Basically, it contains a stem, serving the purpose of fixing the bracket to the sash frame, and a mounting arm, serving as a holder for mounting a side casing and a fixing element. The bracket is preferably fixed on the corner of the sash frame, onto its side edges, constituting an additional reinforcement of the sash structure. This position of the bracket allows for an improvement in its versatility, among others, by installing a holder for a gas spring, aiding the opening and closing of the sash. The mounting arm is preferably a flat element bent to the outside of the sash, preferably parallel to the window plane. In such a position, the mounting arm provides for a possibility of using the free space between it and the window frame elements to install a lock for blocking the fixing element after its installation on the mounting arm.

[0015] The fixing element is basically made of plastic due to the possibility of obtaining the desired shape relatively easily and the aesthetics of the visible external surfaces. The fixing element of the roof window according to the invention basically serves the purpose of mounting of the upper casing at the casing's end. Use of a mirror-image fixing element at the other end of the upper casing enables a stable and firm mounting of a rigid upper casing. A distinguishing feature of the fixing element of the roof window according to the invention is the solution of a mounting slot for the upper casing. Basically, it has a shape of the upper casing profile, the casing being inserted longitudinally to the mounting slot during the installation. The width of the mounting slot is selected so as to the distance between the upper wall and the lower wall of the mounting slot ensures no occurrence of the effect of external wall wetting by rainfall in narrow crevices thanks to surface tension. The first barrier for water is an external sealing strip formed by a tight contact of the external surface of the upper casing and the upper wall of the mounting slot in their contact zone after installation. Elastic compression of the upper casing in the mounting slot is ensured by a set of longitudinal ribs with height matching with the thickness of the metal sheet of the upper casing so as to enable its easy insertion and removal, with simultaneous formation of the sealing strip. Maximum height of the longitudinal ribs is equal to the difference between the mounting slot width and the thickness of the upper casing metal sheet. The mounting slot has width not smaller than the sum of the thickness of the upper casing metal sheet being inserted to the mounting slot, and the minimum distance between the casing's internal surface and the mounting slot's lower wall, at which the capillary effect does not occur. The spacing of the ribs is selected depending on the rigidity of the upper casing metal sheet so as to elastic deformation of the upper casing does not occur, being of significance for maintaining a high leakproofness of the sealing strip. Possible small amount of water which may penetrate under the surface of the upper casing despite the sealing strip, is stopped on the longitudinal ribs or flows down to a water draining duct running along the edge of the insulating glass unit.

[0016] The fixing element is mounted on the mounting arm of the bracket and locked using a locking mechanism comprising the following main components: a pin fixed in the internal surface of the fixing element, a locking hole in the mounting arm, and a locking bolt installed rotatably on the bracket, on the mounting arm in a plane parallel to the window plane. The pin has a recess in the form of a transverse groove, together with the rotatable locking bolt constituting the locking mechanism being locked after installation of the fixing element on the mounting arm.

[0017] The mounting arm may be used additionally for mounting of the side casing's upper edge, significantly increasing the flexibility of the proposed solution. The side casing has a transverse catch pawl, being inserted into a preferably rectangular through-hole in the mounting arm during installation. Such a mounting of the casing's upper part results in a complete blocking of its linear motion in the plane of the window. Also, a possibility of the transverse catch pawl to slip out from the mounting hole must be prevented. It is realised by a pressure of the side edge of the fixing element, overlapped or pushed onto the side casing during the installation. After blocking the pins by the rotatable locking bolts on both sides of the upper casing, the whole set provides a tight, rigid, and separable connection of the upper casing and the side casings at their upper ends. A significant advantage of the proposed solution consists in its flexibility, resulting from the possibility of the upper casing to shift in the mounting slots of the fixing elements, without any deterioration of the leakproofness of the set. Relative motion of the upper casing and the fixing elements is particularly desirable during the installation of the set. Then, working

tolerance of the installation elements often requires an adjustment of spacing of the elements being connected. The proposed solution provides also a very good mating of the casing elements and the sash structure during large temperature changes. Thermal elongations are compensated by structural expansion joints, being parts of the mounting slots, and resulting from an incomplete insertion of the upper casing. After the whole set of the casings is completed and fixed to the brackets, the distance between the bottoms of the mounting slots of symmetrically mounted fixing elements is longer than the length of the upper casing and forms an expansion joint for compensation of thermal elongations.

[0018] **In the proposed embodiment,** a complete roof hatch with an openable sash is shown as assembled in Fig. 1.

[0019] In Fig. 2, the sash with the whole set of casings and the fixing element as assembled is shown.

[0020] In Fig. 3, a top view of a sash fragment in the corner, with the whole set of casings and the fixing element as assembled, is shown. In Fig. 4, an A-A cross-sectional view is shown, defined in Fig. 3, passing through the pin of the fixing element and the rotation axis of the locking bolt.

[0021] In Fig. 5, a B-B cross-sectional view is shown, perpendicular to the A-A cross-section, defined in Fig. 3, passing through the pin of the fixing element.

[0022] In Fig. 6, an isometric bottom view of the locking mechanism is shown.

[0023] In Fig. 7, an isometric view of the fixing element is shown.

[0024] **In the proposed embodiment** according to the invention, the fixing assembly consists of fixing element 1, mounted on universal bracket 2. Bracket 2 is an element made of structural metal sheet by bending of a flat blank. The bracket comprises stem 21 and mounting arm 22, serving the purpose of a holder for mounting side casing 3 and fixing element 1. Bracket 2 is fastened via stem 21 on the side edges of the corner of sash frame 4. Stem 21 basically has a shape of an angle bar with mounting holes arranged for screws or other connecting media. Arm I 211 of stem 21, adjacent to upper sash member 41 of frame 4 constitutes a base for fixing holder 5 for a gas spring. Arm II 212 of stem 21 is adjacent to side sash frame member 42 of the sash and is fixed to it. Mounting arm 22 is a flat element bent aside of arm II outwards, in parallel to the sash plane.

[0025] Fixing element 1 is made of plastic preferably by injection moulding and it basically serves the purpose of mounting and fixing of upper casing 6 at the casing's end using mounting slot 11. During the installation, upper casing 6 is inserted longitudinally into mounting slot 11. The width of mounting slot 11 ensures that no capillary effect occurs, i.e. the effect of wetting of internal walls in narrow crevices by rainfall water utilising surface tension. The lack of the capillary effect in the point of contact of mounting slot 11 and upper casing 6 is ensured by tight connection of external surface 61 of upper casing 6 and upper wall 111 of mounting slot 11 in the area of their mutual contact after installation. Pressure of upper casing 6 to upper wall 111 in mounting slot 11 is ensured by a set of longitudinal ribs 12 with height equal to the difference between the thickness of mounting slot 11 and that of upper casing metal sheet 6, while maintaining a slight installation allowance. Mounting slot 11 has a width not smaller than the sum of the thickness of upper casing metal sheet 6 being inserted to mounting slot 11, and the minimum distance between upper casing's 6 internal surface 62 and mounting slot's 11 lower wall 112, at which the capillary effect does not occur. The spacing of longitudinal ribs 12 is selected so as to the elastic deformation of upper casing 6 does not occur during the installation and operation. With careless installation or transport, upper casing 6 or the fixing element may be deformed or damaged, increasing the risk of water penetration through the sealing strip under the surface of the casing elements. Possible small amount of water which may penetrate under the surface of upper casing 6 despite the sealing strip, is stopped on longitudinal ribs 12 or flows down to a water draining duct running along the edge of the insulating glass unit of the sash.

[0026] Fixing element 1 is mounted on mounting arm 22 of bracket 2 and locked using a locking mechanism, having the following main components: pin 13 fixed in the internal surface of fixing element 1, locking hole 221 in mounting arm 22, and locking bolt 23 installed rotatably on mounting arm 22, on the side opposite to mounting surface 221 of mounting arm 22, in a plane parallel to the window plane. During the installation, the pin 13 is inserted into locking hole 222. Pin 13 has a recess in the form of transverse groove 131, which, in the installed position of fixing element 1, is located on the height of locking bolt 23. After insertion of locking bolt 23 by rotary motion into the transverse groove, the possibility of slipping of pin 13 off from locking hole 222 is blocked, and an immovable mounting of the fixing element 1 on bracket 2 is secured. Additionally, in order to facilitate the installation, pin 13 has elastic elements 132, ensuring its preinstallation in locking hole 222 of mounting arm 22.

[0027] Mounting arm 22 is additionally used for mounting of side casing's 3 upper edge made of metal sheet. Side casing 3 has transverse catch pawl 31, made by bending of metal sheet of the same blank, the pawl being inserted into rectangular through-hole 223 in mounting arm 22 during the installation. Transverse catch pawl 31 is protected from slipping off from through-hole 223 by the pressure of side edge 14 of fixing element 1, overlapped onto side casing 3 during installation. After blocking pins 13 by the rotatable locking bolts 23, the set of two fixing assemblies on both ends of upper casing 6, provides a tight, rigid and separable connection of upper casing 6 and additionally side casings 3 at their upper ends.

[0028] A possibility of a displacement of the upper casing in the mounting slots of the fixing elements is particularly desirable during the installation of the set and after

the installation of the whole set for compensation of thermal elongation. Thermal elongation is compensated by structural expansion joints 113, being parts of mounting slots 11, and resulting from an incomplete insertion of upper casing 6. After the whole set of the casings is completed and fixed to the brackets, the distance between the bottoms of mounting slots 11 of symmetrically mounted fixing elements is longer than the length of upper casing 6.

Claims

1. A roof window or a roof hatch with a sash openable outwards, where the sash comprising an upper member, a side members, a lower member, and the roof window or the roof hatch comprising casings mounted on the sash frame (4), including side casings (3), covering basically the side sash frame members (42), an upper casing (6) covering basically the upper sash frame member (41), and a lower casing covering basically the lower sash frame member, also comprising two fixing assemblies, being mutual mirror images in relation to a plane of symmetry of the upper casing (6), arranged for fixing the upper casing (6) and the side casings (3) of the roof window sash using connecting elements which do not require breaching a structural integrity of the casing, and the fixing assembly comprising a fixing element (1) arranged for fixing the upper casing (6), containing a mounting slot (11) for a longitudinal insertion of an edge of the upper casing (6), the element (1) being immovably mounted on a bracket (2), said bracket (2) comprising a stem (21) fixed to the sash frame (4), and a mounting arm (22) with a mounting surface (221) and a locking hole (222) arranged for mounting the fixing element (1) on the mounting arm (22) and lock them using a locking mechanism **characterised in that** the locking mechanism is formed by a pin (13) with a transverse groove (131) fixed in the internal surface of the fixing element (1), the locking hole (222) in the mounting arm (22), and a locking bolt (23), being inserted into the transverse groove (131) of pin (13), installed rotatably on the mounting arm (22) in a plane parallel to the window plane.

2. A roof window according to claim 1, **characterised in that** mounting slot (11) has a set of longitudinal ribs (12) with maximum height equal to the difference between the thickness of the mounting slot (11) and that of a metal sheet of the upper casing (6).

3. A roof window according to claim 1 or 2, **characterised in that** the mounting slot (11) has a thickness not smaller than the sum of the thickness of the metal sheet of upper casing (6) being inserted to the mounting slot (11) and the minimum distance between an internal surface (62) of the upper casing (6) and a lower wall (112) of the mounting slot (11), at which the capillary effect does not occur.

4. A roof window according to the preceding claims, **characterised in that** after assembling whole set of the casings, the distance between a bottoms of the mounting slots (11) of symmetrically mounted fixing elements (1) is longer than the length of the upper casing (6) and forms a structural expansion joint for compensation of a thermal elongation.

5. A roof window according to claim 1, **characterised in that** the mounting arm (22) comprises a through-hole (223) for mounting of a transverse catch pawl (31) of the side casing (3).

6. A roof window according to claim 1 **characterised in that** pin (13) comprises elastic elements (132), ensuring its pre-installation in the locking hole (222) of the mounting arm (22).

7. A roof window according to claim 1 or 6, **characterised in that** the locking bolt (23) is fixed on the side opposite to the mounting surface (221) of the mounting arm (22).

8. A roof window according to any of the preceding claims, **characterised in that** the bracket (2) comprises a holder (5) for a gas spring.

Patentansprüche

1. Dachfenster oder Dachausstieg mit einem nach außen zu öffnenden Flügel, wobei der Flügel ein oberes Rahmenholz, Seitenrahmenhölzer sowie ein unteres Rahmenholz besitzt; das Dachfenster oder der Dachausstieg besitzt auch Abdeckungen, die auf dem Rahmen des Flügels (4) aufgesetzt sind, von denen die Seitenabdeckungen (3) grundsätzlich die Seitenrahmenhölzer (42), die obere Abdeckung (6) grundsätzlich das obere Rahmenholz (41) und die untere Abdeckung das untere Rahmenholz bedecken, die wiederum zwei Befestigungsbaugruppen enthalten, die grundsätzlich das Spiegelbild in Bezug auf die Symmetrieebene der oberen Abdeckung (6) sind, welche die obere Abdeckung (6) und die Seitenabdeckungen (3) des Dachfensterflügels mit Hilfe von Verbindungselementen befestigen, die keine Unterbrechung der Kontinuität der Abdeckungsstruktur erfordern; die Befestigungsbaugruppe hat ein Befestigungselement (1) für die obere Abdeckung (6), das einen Aufsetzspalt (11) für das Längseinschieben der Endkante der oberen Abdeckung (6) enthält und das Befestigungselement (1) ist auf der Stütze (2) nicht verschiebbar aufgesetzt, wobei die Stütze (2) einen Schaft (21) hat, der am Rahmen des Flügels (4) befestigt ist, sowie einen Aufsetzrah-

men (22), mit einer Aufsetzfläche (221) und der Riegelöffnung (222) zum Befestigen des Befestigungselements auf einem Aufsetzarm (22) und zu ihrem Blockieren mittels eines Blockademechanismus **dadurch gekennzeichnet, dass** den Blockademechanismus ein Zapfen (13) mit der Quervertiefung (131), verfestigt an der Innenfläche des Befestigungselementes (1), die Riegelöffnung (222) im Aufsetzarm (22) sowie der Riegel (23) bilden, eingeschoben in die Quervertiefung (131) des Zapfens (13), drehbar befestigt auf einem Aufsetzarm (22) in der Ebene parallel zur Ebene des Fensters.

2. Das Dachfenster nach Anspruch 1, **dadurch gekennzeichnet, dass** der Aufsetzspalt (11) einen Satz von Längsrippen (12) mit einer maximalen Höhe als Differenz der Dicke des Aufsetzspaltes (11) und der Blechdicke der oberen Abdeckung (6) hat.

3. Das Dachfenster nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der Aufsetzspalt (11) eine Dicke hat, die nicht geringer als die Summe der Blechdicke der oberen Abdeckung (6) ist, eingeschoben in den Aufsetzspalt (11), und des minimalen Abstandes zwischen der Innenfläche (62) der oberen Abdeckung (6) und der unteren Wand (112) des Aufsetzspaltes (11), bei der kein Kapillareffekt auftritt.

4. Das Dachfenster nach den vorhergehenden Ansprüchen, **dadurch gekennzeichnet, dass** beim Zusammenlegen aller Abdeckungen der Abstand zwischen den Böden des Aufsetzspaltes (11) der symmetrisch aufgesetzten Befestigungselemente (1) größer ist als die Länge der oberen Abdeckung (6) und eine Dehnung zur Kompensation der thermischen Verlängerungen bildet.

5. Das Dachfenster nach Anspruch 1, **dadurch gekennzeichnet, dass** der Aufsetzarm (22) eine Durchgangsöffnung (223) für den Einsatz eines Querhakens (31) der Seitenabdeckung (3) hat.

6. Das Dachfenster nach Anspruch 1, **dadurch gekennzeichnet, dass** der Zapfen (13) Federelemente (132) hat, die eine Vormontage in der Riegelöffnung (222) des Aufsetzarmes (22) gewährleisten.

7. Das Dachfenster nach Anspruch 1 oder 6, **dadurch gekennzeichnet, dass** der Riegel (23) an der gegenüberliegenden Seite zur Aufsetzfläche (221) des Aufsetzarmes (22) befestigt wird.

8. Das Dachfenster nach einem beliebigen vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Stütze (2) eine Halterung (5) für die Gasfeder hat.

Revendications

1. La fenêtre de toit ou la trappe de toit avec l'ouvrant qui s'ouvre à l'extérieur où l'ouvrant est doté d'un cadre supérieur, les cadres latéraux et le cadre inférieur, la fenêtre de toit et la trappe de toit possèdent aussi les protections fixées sur le cadre de l'ouvrant (4) dont les protections latérales (3) couvrent essentiellement les cadres latéraux (42), la protection supérieur (6) couvre essentiellement le cadre supérieur (41) et la protection inférieure couvre essentiellement le cadre inférieur, contenant deux ensembles de fixation qui essentiellement sont une image miroir par rapport au plan de symétrie de la protection supérieure (6) fixant la protection supérieure (6) et les protections latérales (3) de la fenêtre de toit à l'aide des raccords qui n'exigent pas l'interruption de la continuité de la structure de la protection, l'ensemble de fixation est doté d'un élément de fixation (1) et la protection supérieur (6), possédant un joint d'encastrement (11) pour insérer d'une manière longitudinale e bord d'extrême de la protection supérieure (6) et l'élément de fixation (1) est encastré de manière fixe sur le support (2), et le support (2) possède une tige (21), fixé sur le cadre de l'ouvrant (4) et le bras d'encastrement (22), avec la surface d'encastrement (221) et l'ouverture de verrouillage (222) pour fixer l'élément de fixation (1) sur le bras d'encastrement (22) et pour les verrouiller à l'aide du mécanisme de verrouillage **caractérisée en ce que** le mécanisme de verrouillage est composé d'un pivot (13) avec la rainure transversale (131), fixée sur la surface interne de l'élément de fixation (1), l'ouverture de verrouillage (222) dans le bras d'encastrement (22) et le verrou (23), inséré dans la rainure transversale (131) du pivot (13), fixé d'une manière rotative sur le bras d'encastrement (22) sur la surface parallèle à la surface de la fenêtre.

2. La fenêtre de toit selon la revendication 1, **caractérisée en ce que** le joint d'encastrement (11) possède un ensemble de nervures longitudinales (12) de la hauteur maximale qui est la différence de l'épaisseur du joint d'encastrement (11) et de l'épaisseur de la tôle de la protection supérieure (6).

3. La fenêtre de toit selon la revendication 1 ou 2, **caractérisée en ce que** le joint d'encastrement (11) a l'épaisseur non inférieure à la somme de l'épaisseur de la tôle de la protection supérieure (6) insérée dans le joint d'encastrement (11) et de la distance minimale entre la surface interne (62) de la protection supérieure (6) et la paroi inférieure (112) du joint d'encastrement (11) où l'effet capillaire n'existe pas.

4. La fenêtre de toit selon les revendications précédentes, **caractérisée en ce que** dans l'assemblage de toutes les protections la distance entre les fonds du

joint d'encastrement (11) des éléments de fixation encastrés symétriquement (1) est supérieure à la longueur de la protection supérieure (6) en formant la dilatation pour compenser les allongements thermiques.

5. La fenêtre de toit selon la revendication 1, **caractérisée en ce que,** le bras d'encastrement (22) possède un trou de passage (223) pour encastrer le cran transversal (31) de la protection latérale (3).

6. La fenêtre de toit selon la revendication 1, **caractérisée en ce que**, le pivot (13) possède des éléments élastiques (132) garantissant le montage préliminaire dans l'ouverture de verrouillage (222) du bras d'encastrement (22).

7. La fenêtre de toit selon la revendication 1 ou 6, **caractérisée en ce que** le verrou (23) est monté sur le côté opposé à la surface d'encastrement (221) du bras d'encastrement (22).

8. La fenêtre de toit selon l'une des revendications précédentes **caractérisée en ce que** le support (2) possède la poignée (5) le ressort à gaz.

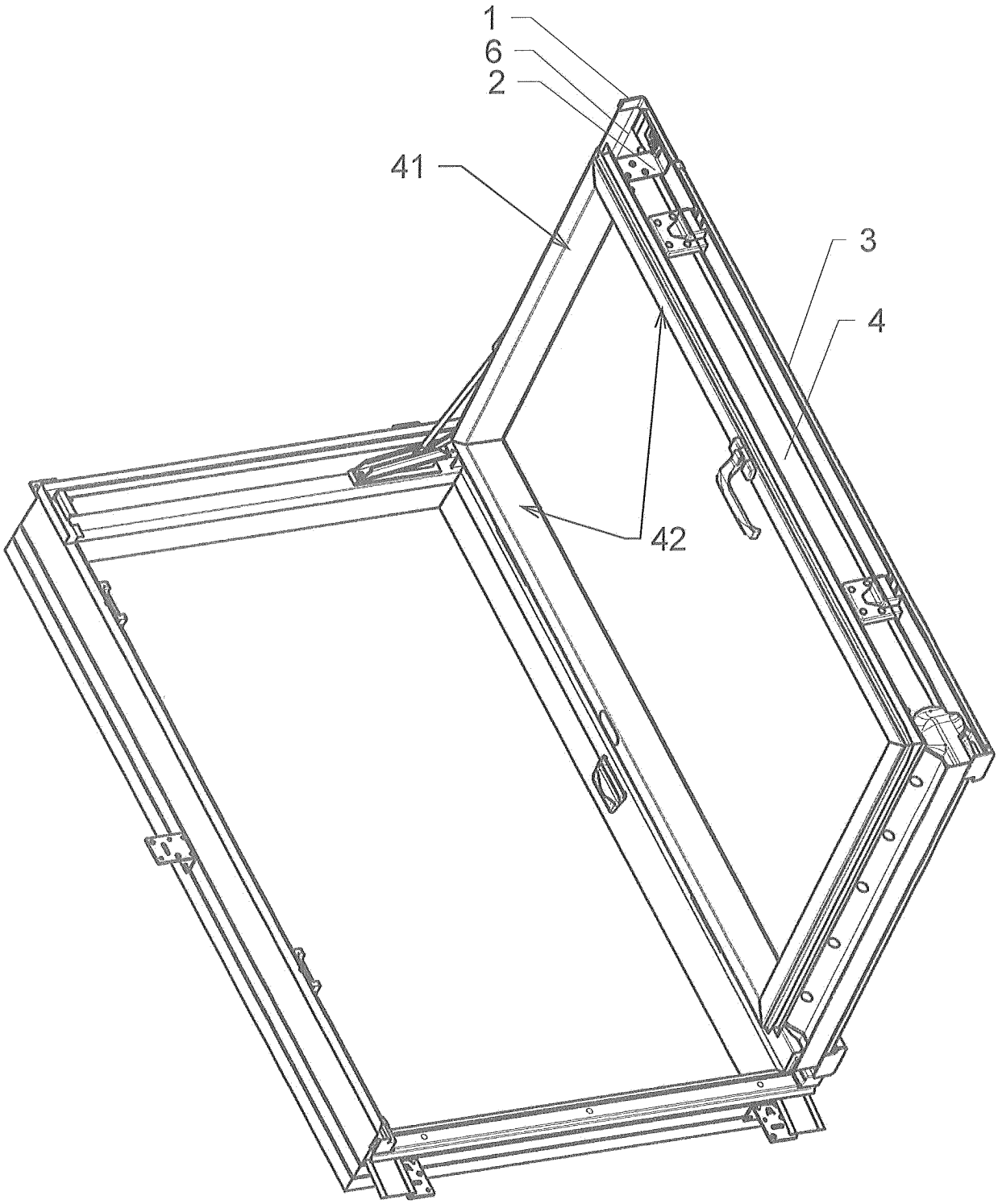

Fig. 1

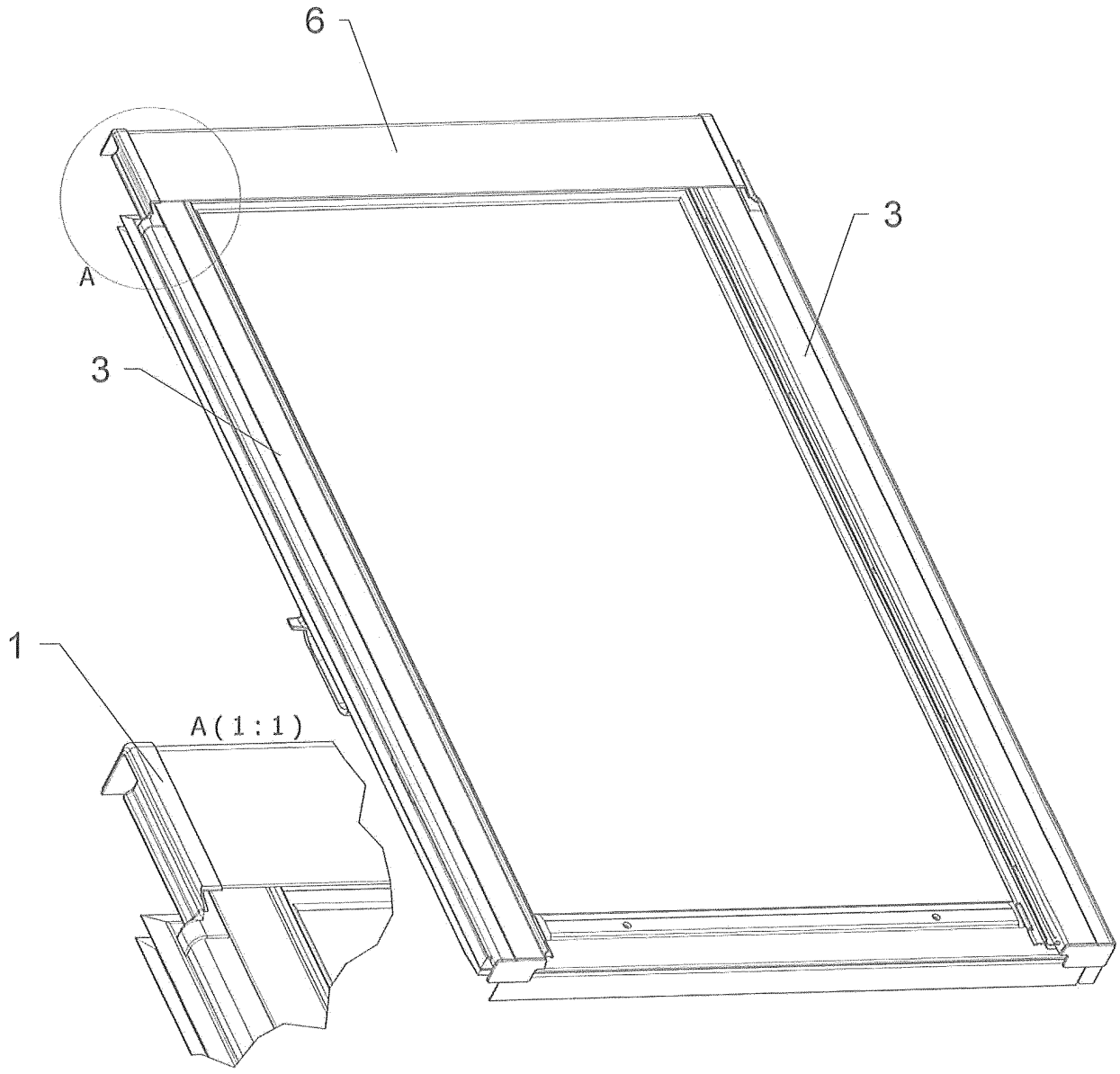

Fig. 2

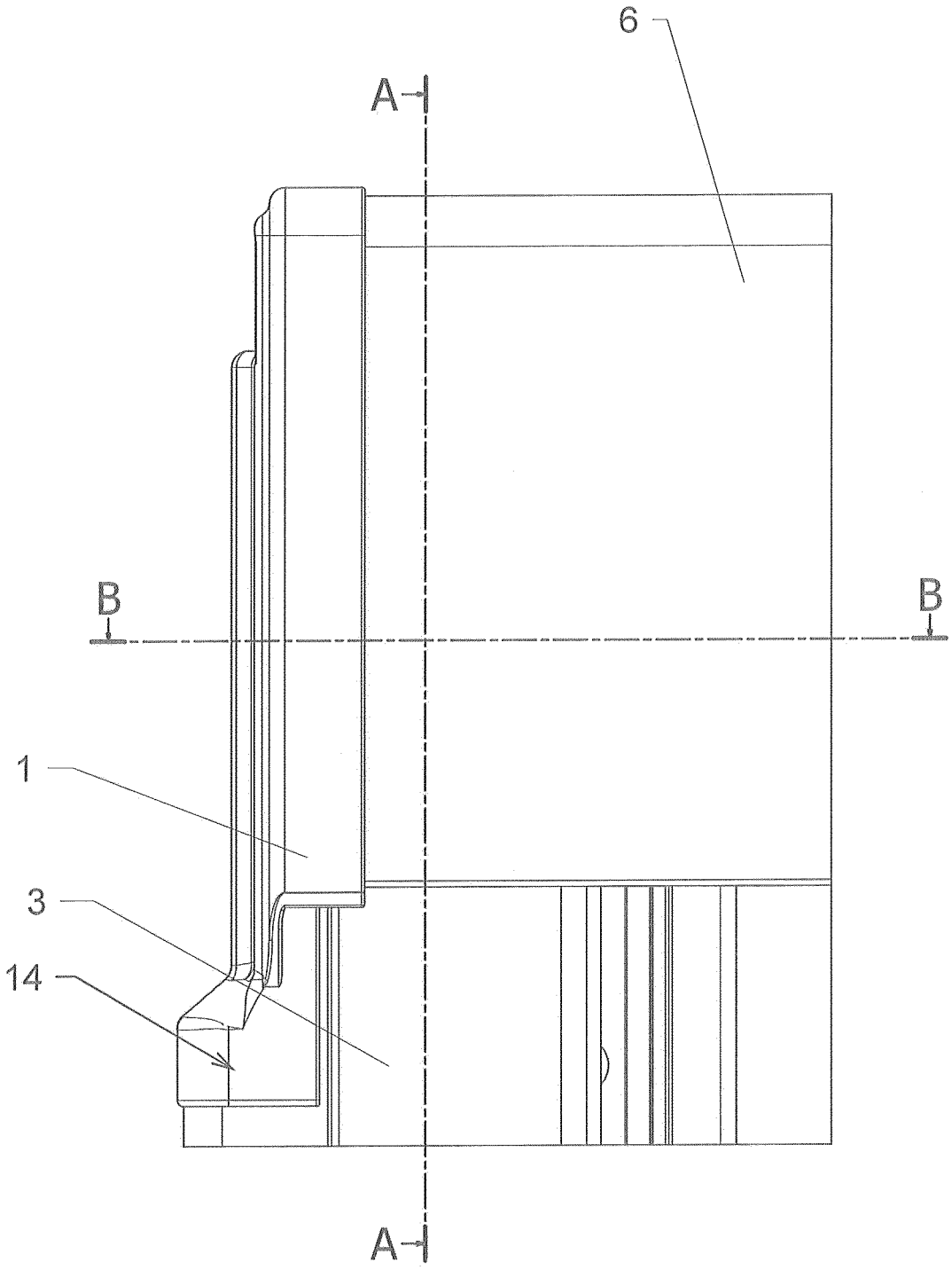

Fig. 3

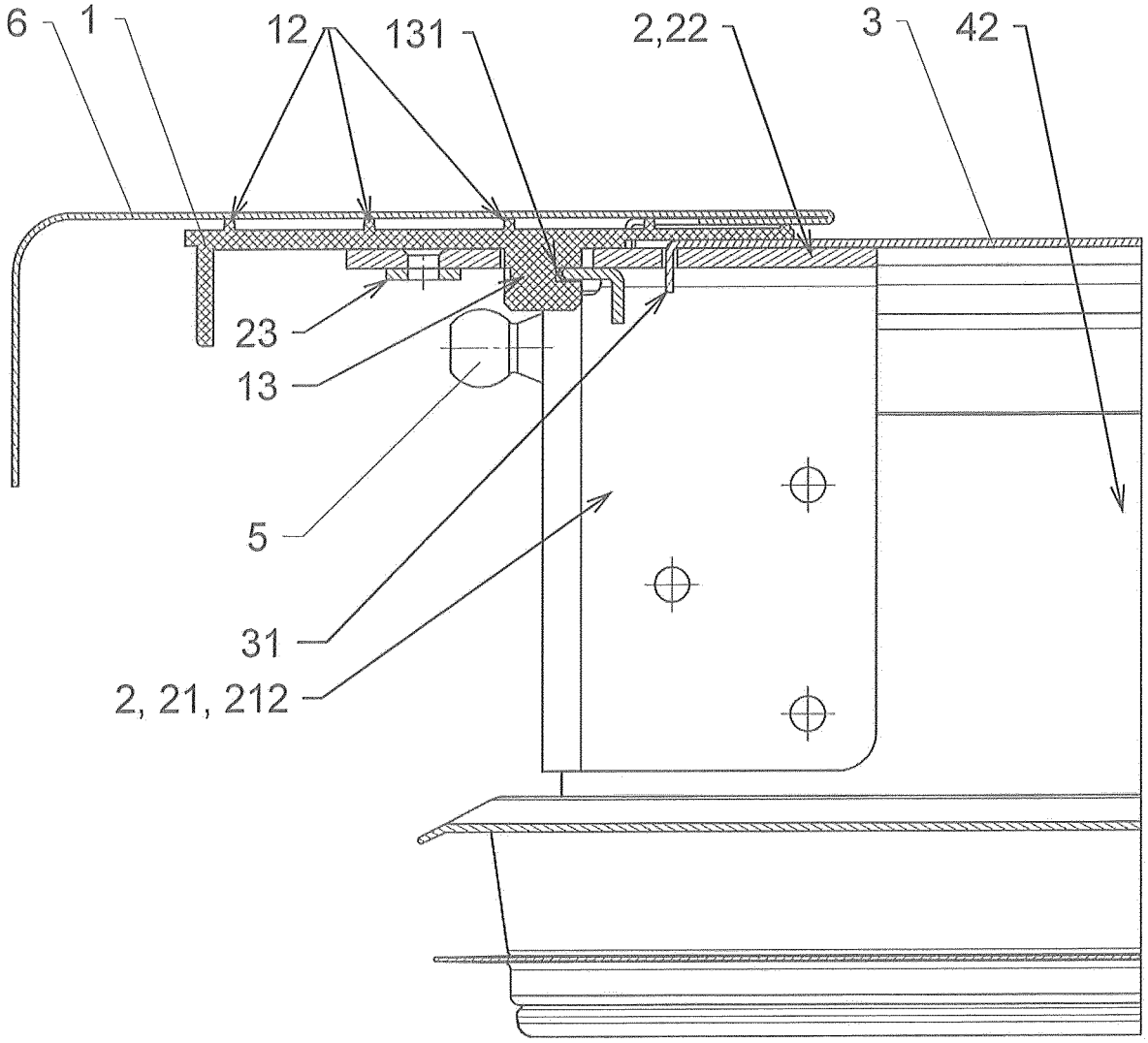

Fig. 4

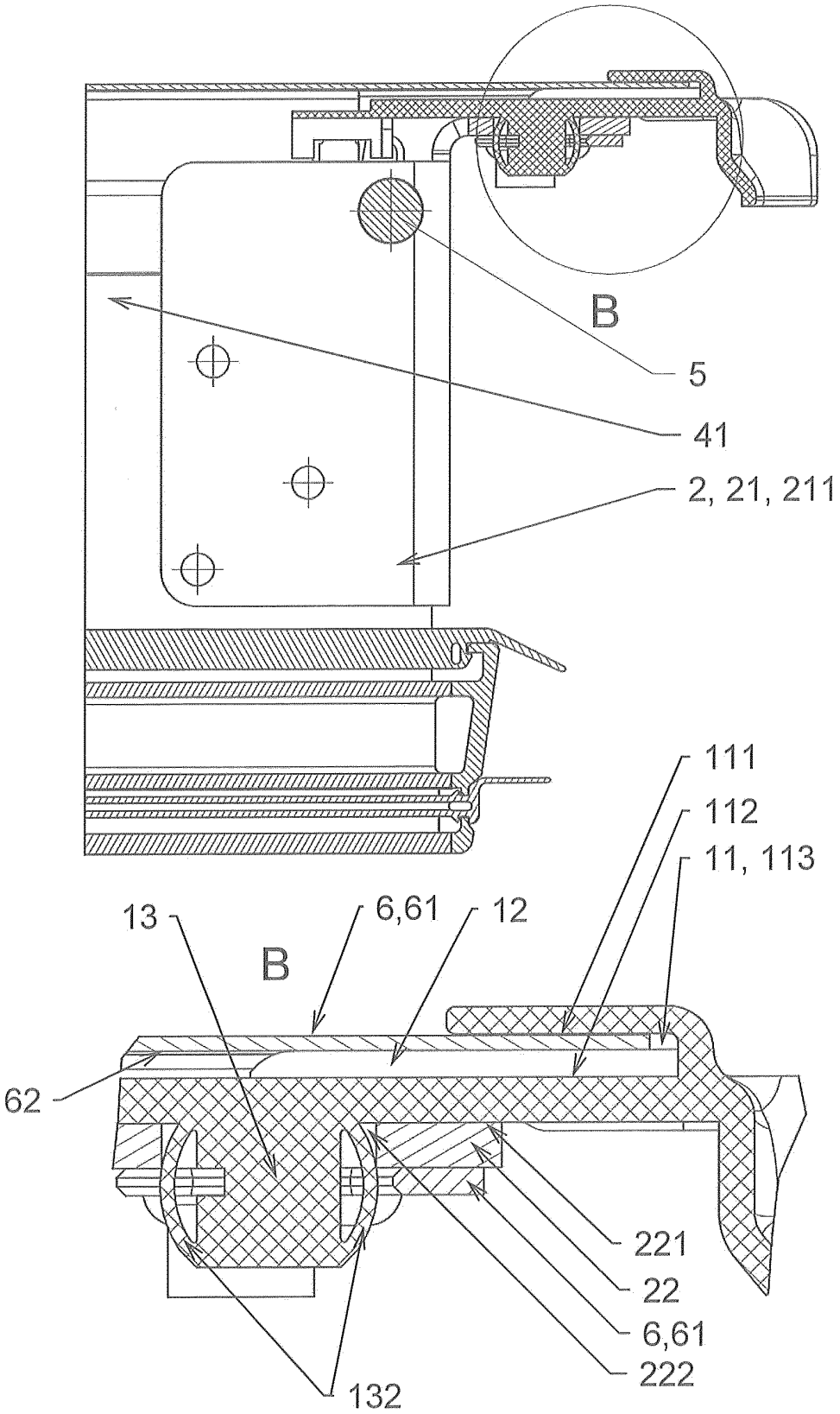

Fig. 5

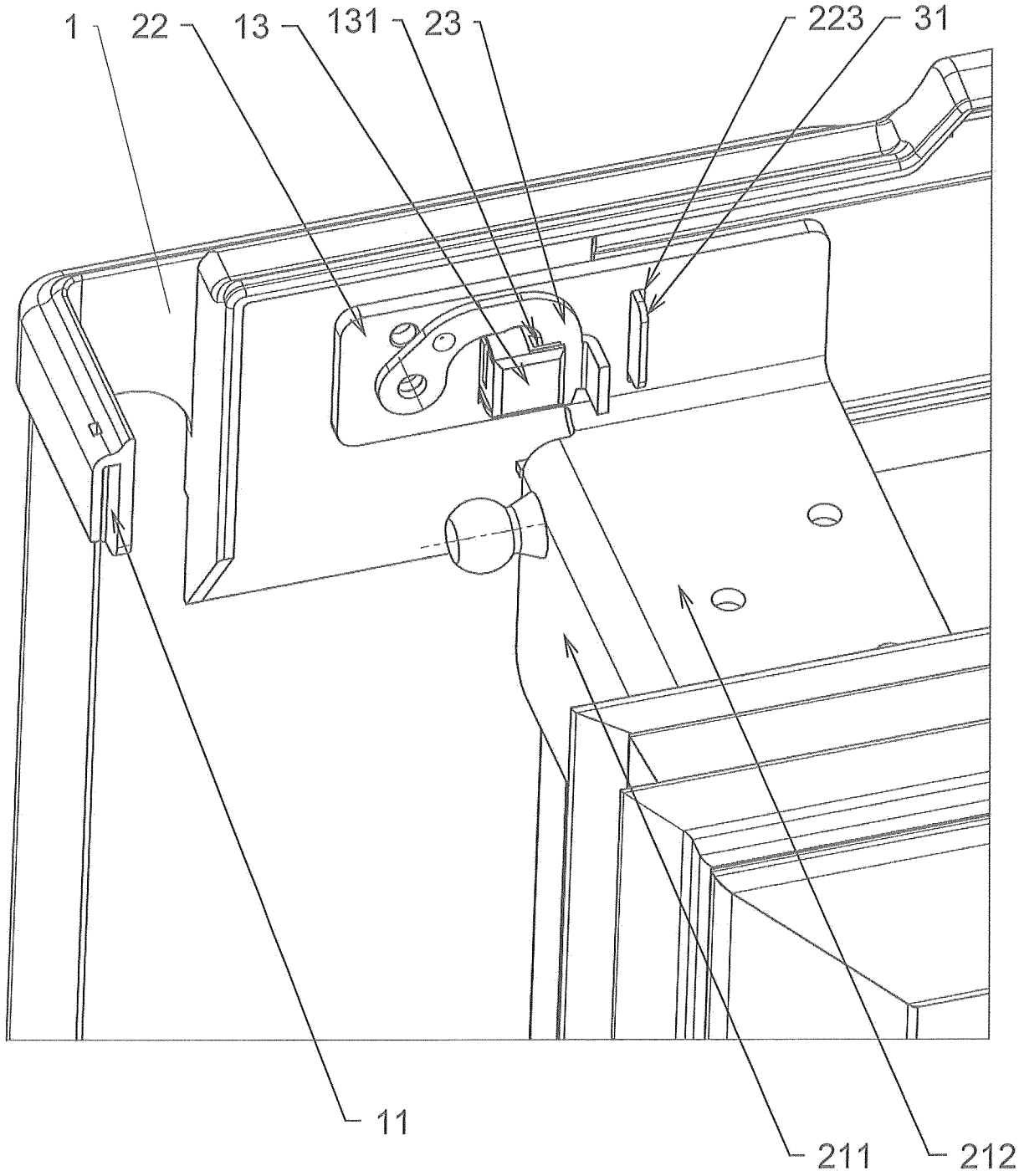

Fig. 6

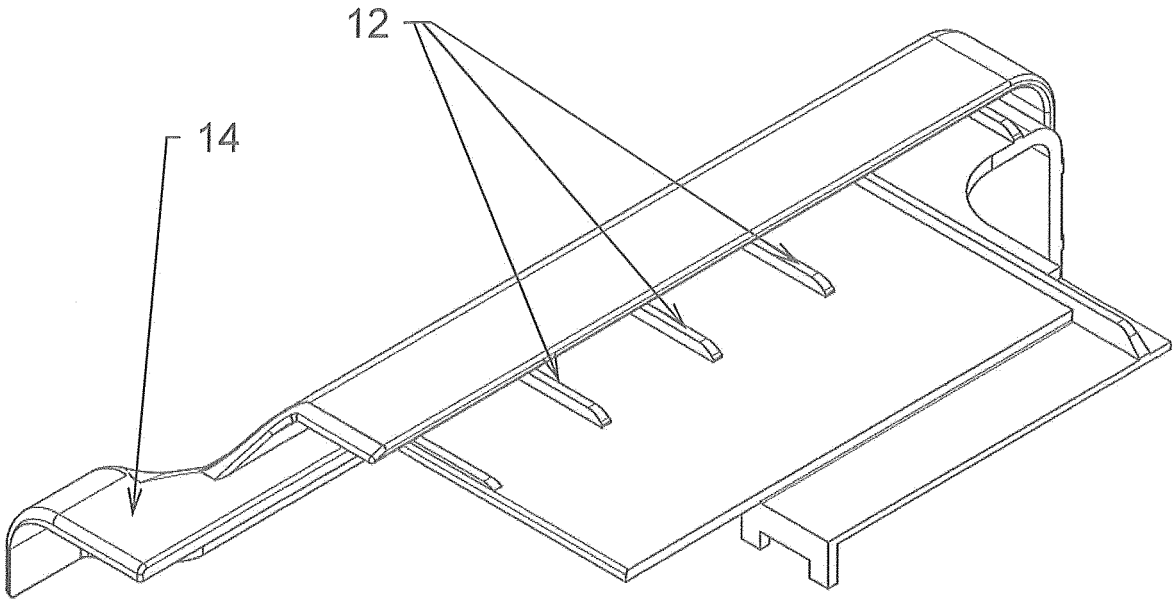

Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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